

DURACAL[®] Cement

The high-yield, fast-setting, high-compressive-strength concrete patch material that shortens tie-ups to keep traffic moving.



DURACAL Cement is a specially formulated concrete patching product. It sets fast, expands slightly and develops high early strength, making it ideal for pavement repairs. Usable in temperatures as low as 32°F, DURACAL Cement patches stand up to freeze-thaw cycles, salt application and heavy traffic.

What's more, DURACAL Cement has greater yield than most other concrete patching compounds. It can be used unaggregated or mixed with sand and aggregate . . . up to equal parts of each.

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Many Uses

DURACAL Cement is an effective patching material for many paving applications including expressways, roads, ramps, bridges, streets, parking lots and commercial concrete floors. It is not recommended for structural repairs.

Other formulations of DURACAL Cement have been developed for special patching applications. DURACAL AG Cement has a longer setting time for situations where aggregates used are accelerative.

Expands Upon Setting

Unlike other pavement patching materials, DURACAL Cement expands upon setting to assure tight contact with the surrounding pavement. This tight plug helps restrict the seepage of water and salt into the patched area that can corrode reinforcing rods and further damage the pavement.

Resists Freeze-Thaw Cycles

DURACAL Cement exhibits strong field performance under freeze-thaw conditions. Effective life may be extended further by applying a sealer approved by appropriate state agencies or regulatory bodies.

High Yield

The yield of DURACAL Cement is higher than that of most other road patching materials, keeping storage and handling to a minimum. Used unaggregated, 50 lbs. DURACAL Cement with 1.5 gal. water will fill 0.45 cu. ft. But 50 lbs. DURACAL Cement mixed with 50 lbs. sand, 50 lbs. coarse aggregate and 1.75 gal. water will fill approximately 1.07 cu. ft. and still deliver a patch with excellent integrity and high 28-day compressive strength.

Easy to Mix and Handle

Mixed with the recommended amount of water, sand and coarse aggregate in a mechanical mortar mixer, DURACAL Cement is lump-free and ready-to-use in less than five minutes. (Hand mixing is not recommended). Once applied to the area to be patched, DURACAL Cement can be screeded and trowelled.

Works at Low Temperatures

DURACAL Cement performs in temperatures as low as 32°F. Although setting time lengthens as temperatures decrease, the cement patch will perform to expectations.

Fast Setting

DURACAL Cement sets in 20 - 35 minutes and is strong enough to handle normal traffic one hour after set. The total process of pavement repair—from erecting the barricades to resuming normal traffic—can take place in less than five hours.

High Compressive Strength

During the setting process and for several days following, DURACAL Cement's compressive strength improves. One hour after set, the cement will develop compressive strength from 3,200 to 4,100 psi, depending on the amount of aggregate and water used. After 28 days, the compressive strength of unaggregated DURACAL Cement will reach approximately 10,000 psi (see Table 1).



Set barricades

Patch Preparation

Place barricades and warning lights. Mark off damaged areas and make a 2" deep cut with masonry saw or other suitable equipment around perimeter of the damaged areas. Break out all material within the cut area and clean hole of all debris. Lightly dampen the surrounding concrete, especially in hot weather. It is important to have most, if not all, damaged areas prepared before mixing the DURACAL Cement, because the mixing, placement and finishing can be accomplished in a very short time.

Equipment

For mixes containing only sand, a ribbon-type plaster mixer with rubber wipers is recommended. The batch size will be controlled by the size of the mixer.

For mixes containing sand and coarse aggregate, a standard drum-type concrete mixer is recommended. The batch size will be controlled by size of the mixer. However, due to the fast setting time of DURACAL Cement, the total mix should be limited to a quantity that can be mixed and placed in 15 minutes.

The Concrete-Mobile manufactured by National Concrete Machinery Co. also has been used successfully in mixing and placing DURACAL Cement.

Mixing Proportions

This product is a fine cement powder packaged in 50-lb. bags. DURACAL Cement can be used neat or with aggregate and has a manufactured set time of 20 - 35 minutes. It can be mixed with equal parts by weight of both sand and coarse aggregate and a measured amount of water. The following proportions are typical:

- 50 lbs. DURACAL Cement
- 50 lbs. Fine aggregate (sand) meeting ASTM Specification C33
- 50 lbs. Coarse aggregate meeting ASTM Specifications C33, ASTM size No. 8.

1³/₄ gallons water

The batch may be scaled up as long as the mixer capacity is not exceeded.

Mixing Procedure

1. Introduce measured amount of water to mixer.
2. Add half of the aggregate (all of the coarse aggregate first if both aggregate and sand are being used in a 1:1:1 ratio).
3. Add DURACAL Cement to water and aggregate with mixer operating.
4. Slowly add the remainder of aggregates.

5. Mix one minute. Then, if necessary, add more water in small amounts during the second minute of mixing to obtain desired fluidity.

6. Mix until lump-free, but not for more than five minutes.
7. Dump batch and immediately deliver DURACAL mix to prepared pavement area. Clean mixer by adding water and allowing mixer to run. Dump cleaning water before starting another batch.

Note: Prior to placing DURACAL Cement, the area to be covered should be wetted with water to minimize water withdrawal from the cement. However, there should be no free-standing water in the cavity to be patched.

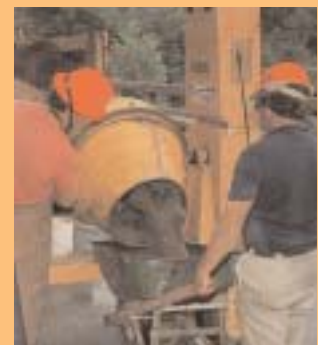
8. Level the DURACAL Cement to the surrounding pavement with an appropriate screeding device, and before set, broom finish if necessary. If a smooth finish is desired, trowel lightly before set.
9. Allow DURACAL Cement to develop strength for a minimum of one hour after set. After this time, traffic can resume over patched areas.
10. Seal with approved concrete sealer or curing membrane if desired.



Break out damaged surface



Prepare area



Mixed material

Precautions When Using DURACAL Cement for Pavement Repair

1. Damaged pavement must be completely removed, and the cavity cleared free of debris. Provide at least a 2" vertical cut at the perimeter of the prepared area. Do not trowel DURACAL to a thin, feathered edge.
2. Do not permit DURACAL Cement mix to freeze before set has taken place.

If DURACAL Cement is to be used at near freezing temperatures, the following is recommended.

(a) Keep materials and equipment as warm as possible.

(b) Keep mortar and adjacent pavement above 32°F until DURACAL Cement has set.

3. Under hot, windy conditions, use of an approved concrete curing membrane may be required to prevent surface dry out.
4. If DURACAL Cement is being used to patch an area adjacent to non-concrete materials such as control or expansion joints, a bonding agent approved by appropriate government regulatory agencies and used in accordance with manufacturer's recommendations is suggested.

5. If area to be patched is less than 2" in thickness, a bonding agent may be required.
6. Determine that the patch has set for at least one hour before allowing traffic to resume over patched area.
7. Clean equipment with water according to manufacturer's recommendations after mixing each batch of material.

Limitations

1. Use above grade only.
2. Application, neat or aggregated, must be at temperatures above 32°F.
3. Not for use in structural applications. Consult a United States Gypsum Company representative or call 312/606-5582 for applications not covered by this publication.



Place material



Trowel lightly



Finished patch

Table 1. Typical Characteristics and Properties of DURACAL Cement

Description	Unaggregated	Job-Aggregated ¹	Job-Aggregated ¹
Recommended Mixes	50 lbs. DURACAL 1½ gal. Water	50 lbs. DURACAL 1½ gal. Water 50 lbs. Sand	50 lbs. DURACAL 1¾ gal. Water ² 50 lbs. Sand 50 lbs. Coarse ³ Aggregate
Setting time, minutes	20 - 35	20 - 35	20 - 35
Yield; cu. ft./50 lb. bag.	0.45	0.77	1.07
Lbs. DURACAL Cement Required/ cu. ft. of mix	110.0	65.0	46.0
Setting expansion, %	0.20	0.09	0.05
Net expansion after drying, %	0.125	0.04	0.01
Wet compressive strength, psi 2" Cube Molds, moist-cured			
1 hr. after set	4,100	3,300	3,200
3 hr. after set	4,100	3,300	3,200
6 hr. after set	5,100	3,700	3,600
1 day	8,100	6,200	6,100
3 days	9,300	6,900	6,800
28 days	10,500	8,800	8,500
Resistance to freeze-thaw cycling	Excellent	Good	Fair

¹ Max size of coarse aggregate not to exceed 1/2" in diameter.

² Water usage is approximate and will be influenced by water content of aggregate.

³ Manufacturer recommends ASTM size No. 8 aggregate (not to exceed 3/8").



Table 2. DURACAL Outperforms Portland Cement

Comparative Value Chart	DURACAL Cement	Portland Cement
Fast setting	YES	NO
Develops strength quickly	YES	NO
Doesn't require moist curing	YES	NO
Can be used with aggregate	YES	YES
Expands on setting	YES	NO
COMPARE THE SCORES	5 "YES"	1 "YES"

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